S
628.05
W3b
Fall
1989
c.2

Big Sky Clearwater

FALL 1989

MONTANA
CENTENNIAL ISSUE

STATE DOCUMENTS COLLECTION
SEP 18 1989
MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

PLEASE RETURN

Montana State Library
3 0864 1006 7364 2

If you have any ideas or information that you would like to pass along to other people involved in the water and wastewater field, please don't hesitate to contact the office of the Water Quality Bureau. This publication welcomes articles of interest and random pieces of information regarding anything to do with water.

An article may consist of your own thoughts and ideas about something you may have experienced. Perhaps such information could help someone else in their day-to-day work. It could also be a technical article that is developed from research information and library resource material. If it has to do with water and you think it may be of interest, give us a call at the WQB: 444-2406.

If you do not wish to continue receiving this publication please send us your name and address so that we can remove your name from our mailing list.

Water Quality Bureau
Department of Health & Environmental Sciences
Cogswell Building
Helena, MT 59620

Cover designed and drawn by Erich Weber, free-lance artist, paid for by the Montana Environmental Training Center.

The Big Sky Clearwater is for water and wastewater operators across Montana. It is published two times a year by the Water Quality Bureau of the State Department of Health and Environmental Sciences in cooperation with the Montana Section of the American Water Works Association and the Montana Water Pollution Control Association.

Publication dates: February 1 and August 1. Last date to receive contributions is 30 days before publication.

A History of Public Water Supply Law and Water Pollution Control in Montana

By: Donna Howell, Water Quality Bureau
(with excerpts from an article by Kit Walther [formerly with the WQB] and the 1986 and 1988 305(b) Reports)

During our centennial celebration of statehood, it seems appropriate to pause and reflect on the history of public health protection through the regulation of water supplies and water pollution control in Montana. The progress made to date for providing safe potable water and effective wastewater treatment was no small feat, although it may, at times, feel trivial in comparison to current trends in water and wastewater treatment requirements. The following is a brief synopsis of the development of Montana's public water supply program and water pollution control program.

At the turn of the century, typhoid fever was prevalent in many Montana towns. There were badly contaminated water supplies from which whole towns drank; many towns allowed untreated sewage to be discharged into streams and irrigation ditches used as water supplies for dairy cattle and downstream towns; and the streets of many towns, due to a lack of storm sewers, served as open sewers after intense rainfalls and spring runoff. Typhoid was only one of a number of diseases which were rampant in Montana in the early days, including smallpox, diphtheria, and Rocky Mountain spotted fever, although the latter are not water-borne diseases.

In 1901, the state legislature created the State Board of Health to deal with public health matters of the state and required each county to have a local board of health to cope with the public health needs of the immediate vicinities. In spite of the rather broad duties and powers vested in the State Board of Health and county boards of health, neither had powers under the law to stop people, towns and companies from disposing of their untreated sewage and wastes into streams and irrigation ditches. An early report of the State Board of Health (1902-1904) reads: *"A single stool from a typhoid fever patient thrown into one of our small streams or irrigation ditches from which milk cows drink might readily result in infection with typhoid fever of hundreds of people, through the agency of milk. We know of one little town with an irrigating ditch running through it. This ditch is used as a sewer by most of the town, and it is no uncommon sight in that town to see the bottom of the ditch almost covered with feces. From this ditch, all the cows in the neighborhood drink, and some of the people depend on the waters for domestic use. What a chance to start an epidemic of typhoid fever! And yet, the attorneys tell us that we have no power under our laws to stop such conditions."*

Conditions such as described laid the groundwork for more exact state legislation to control sewage disposal and protect domestic water supplies. In 1907, the state legislature passed Montana's first Public Water Supply Law. This law prohibited the discharge of raw sewage and other polluting matter to surface waters used for drinking water, ice supply and other domestic purposes by cities, towns, and public institutions. Under the law, the State Board of Health ordered every city in the state to construct a sewage treatment works.

In 1911, the 1907 law was amended due to local pressures, and treatment was no longer mandatory unless the State Board of Health could prove in a district court that a particular sewage system endangered domestic water or an ice supply. Prior to the 1917 legislative session, a typhoid fever epidemic occurred in Chinook, Harlem, and Laurel. This epidemic, and particularly the Harlem epidemic (106 cases, 5 deaths), was responsible for a change in the 1911 amendments. Treatment was again required, but rather than a requirement by law, it was at the discretion of the Board of Health. The law remained the same until 1945 at which time it was changed to read essentially as it was originally enacted in 1907.

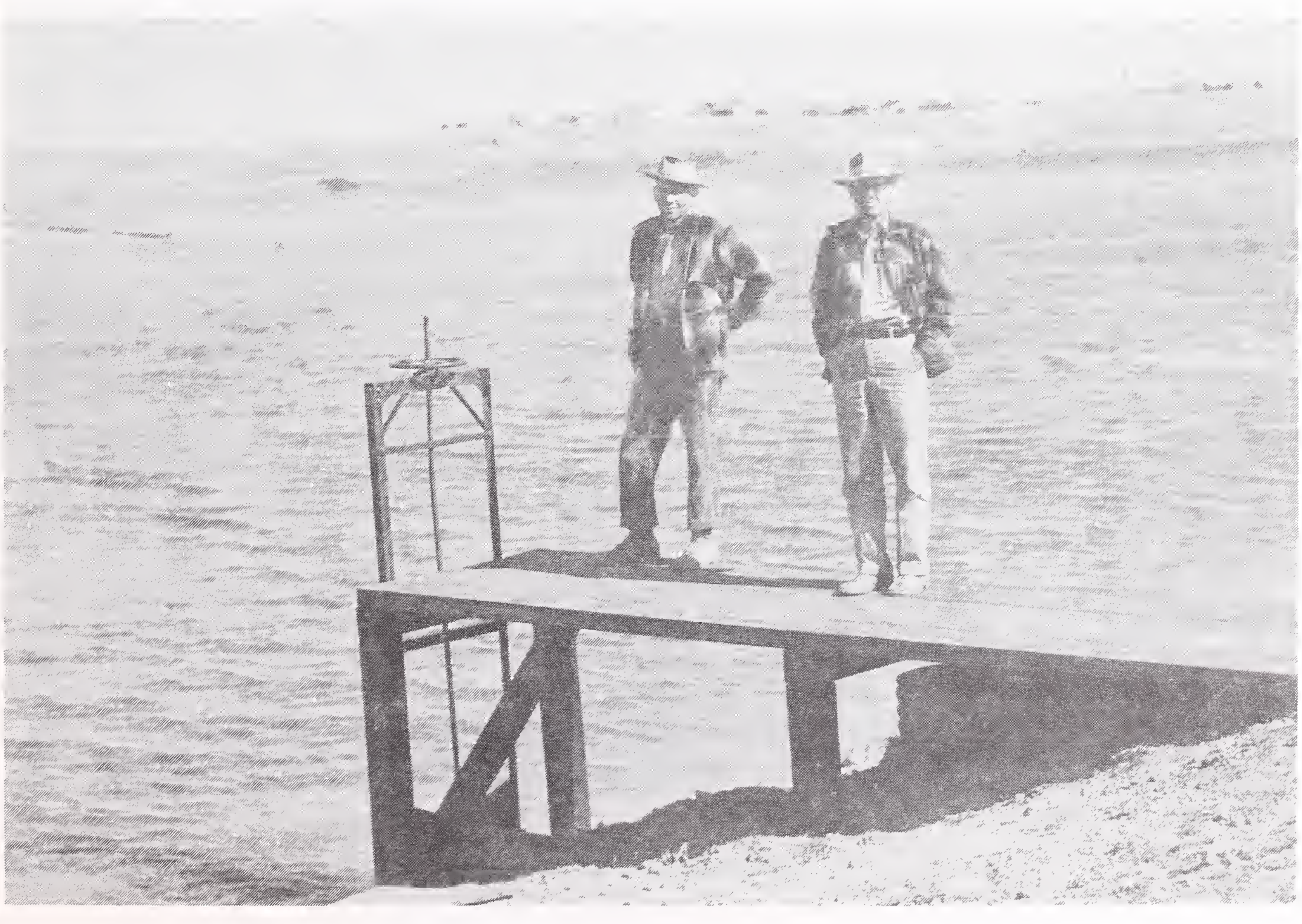
The incidence of typhoid fever in Montana has declined dramatically since 1903 when records were first kept. In 1910, typhoid ranked among the top ten causes of deaths in Montana, but today cases of typhoid are so infrequent that this good fortune is taken for granted. Improvements in the distribution, treating and handling of water, and in treatment and disposal of our sewage wastes have been responsible for this success, as has improved personal hygiene.

Photo by Dr. Tarzwell on Upper Rock Creek, West Fork in 1934

In 1929 the State Board of Health began to recognize that a multitude of materials may occur in waters which could adversely affect public health, domestic water supplies and other beneficial uses such as fish propagation and water for livestock and irrigation. Water quality up to this time had been gauged by bacteriological examinations and reported fecal contamination. Thus began a series of stream pollution studies under limited funding and manpower to evaluate industrial, municipal and agricultural water pollution problems and water quality needs. The objective being possible enactment of comprehensive legislation to control stream pollution and protect the beneficial uses of our lakes and streams.

In 1955, the state legislature passed a water pollution control law to protect domestic water supplies, fish, wildlife, and other aquatic life and recreational, industrial and agricultural uses. The law required that Montana streams be classified according to their present and future most beneficial uses and that water quality criteria and minimum waste treatment requirements be adopted to protect each classified beneficial use. The classification of our streams and adoption of water quality criteria was accomplished in 1960. Except for some later revisions upgrading the standards to reflect water quality improvements, the standards are essentially the same.

Plentywood Lagoon Overflow, October 1, 1953



In 1972, Congress enacted the Federal Water Pollution Control Act Amendments (Public Law 92-500). The federal law has had a profound effect on Montana's water pollution control program. Changes were made in the state's water pollution control law in 1973 to meet federal requirements to administer at the state level the National Pollutant Discharge Elimination System (NPDES) permit program and to broaden the enforcement capabilities of the state law. Along with increased state funding, substantial federal funds have been allocated to Montana to assist implementation of a comprehensive state water pollution control program (Construction Grants Program). Through the Construction Grants Program, EPA shared the costs of planning, designing and constructing municipal wastewater treatment systems where upgrading was required to meet minimum treatment standards or where a public health or water quality problem existed.

The 1987 Amendments to the Clean Water Act prescribe the method by which the Construction Grants Program is to be eliminated. While the grants program is being phased out, a new revolving loan program using state and federal funds will be initiated.

In 1974, Congress passed the Safe Drinking Water Act (SDWA) which established national interim primary drinking water regulations for 23 contaminants plus monitoring and reporting for sodium and corrosion. Montana accepted primary enforcement responsibility (primacy) for the SDWA in 1977. One of the most important aspects of the program is to insure that all public water systems are monitored on a regular basis for bacteriological, radiological, chemical and physical contaminants. Currently, the Public Water Supply Program of the Water Quality Bureau regulates over 2,700 public water supplies statewide.

Prompted by increases in the number of water-borne diseases caused by Giardia, Cryptosporidium, and viral agents, and by increased public concern over the chemical quality of drinking water, Congress sought to increase regulation governing public water supplies. In 1986, the federal Safe Drinking Water Act was reauthorized and amended to include regulations for 83 specific contaminants and monitoring for another 51 unregulated contaminants. EPA must also publish a Drinking Water Priority List (DWPL) of drinking water contaminants that may require regulation under the Safe Drinking Water Act. The list must be published every three years and will generally include disinfection by-products, volatile organic chemicals and synthetic organic compounds. Maximum contaminant levels, maximum contaminant level goals, and monitoring requirements for at least 25 of those contaminants on the DWPL are to be added to the list of regulated contaminants every three years, beginning in 1991. Implementation of the amendments to the federal Safe Drinking Water Act are currently underway, and Montana's retention of primacy requires the state to adopt the federal rules as a minimum.

Although priority public health problems may have changed from discharges of raw sewage and fecal contamination of surface supplies to phosphate removal and organic chemical contaminants, one thing remains the same: we rely heavily on system operations as our primary tool for public health protection. The safety of our public water supplies and the quality of Montana's water resources rely on operator and manager ingenuity, integrity and persistence. Without quality operators, we'd quickly return to the health-threatening conditions faced by our Montana pioneers.

City of Forsyth Improves Water Treatment Plant

By: Kate Miller
Water Quality Bureau, Billings Regional Office

In one short year the City of Forsyth administration, water superintendent, water plant operators, and engineers have transformed a tired old water treatment plant into a reliable production facility which now provides low turbidity, high quality drinking water. The Forsyth water treatment works consists of a conventional treatment process including flash mix, flocculation, sedimentation, and filtration. Source water is the Yellowstone River and presedimentation is not provided. The facility was constructed in 1931 and was expanded and upgraded in 1976. There are approximately 1000 service connections. Plant flow records show daily water production from 0.3 to 1.6 million gallons.

In 1988 Mike Hagel, Water Plant Superintendent, took charge of the facility and realized what a challenge he was facing to control the process and operate equipment that had received marginal maintenance and replacement.

Results of a Comprehensive Performance Evaluation (CPE) conducted at the plant on June 7-9, 1988 by the WQB and Process Applications, Inc. indicated the following obstacles to effective process control and operation:

* Preventive maintenance was lacking; maintenance was performed on a crisis basis and facility performance was directly compromised. The following pieces of equipment were a few of the items out of service or in need of repair:

-raw water meter
-filter effluent control valves
-raw water pump
-alum feeder
-flocculator paddles
-flash mixer
-constant monitoring turbidimeter
-flocculator mud valves

* Inadequate staff number.

* Evaluation of the filters indicated serious problems with the support gravels, filter media and underdrains. (Subsequent investigation by HKM Engineers also confirmed between 10 and 12 inches of media were all that was left in the filters. Apparently air in the backwash water was de-stratifying the filters and media was being lost to the clear well and sludge lagoons.)

* Effluent quality was degraded by high raw water turbidities, lack of presedimentation capabilities and little or no flexibility in coagulant feed rates.

* Solids carryover from the sedimentation basins resulted in excessive solids loading of the filters which were already compromised because they had only 10 to 12 inches of media.

* Cycling of raw water pumps caused fluctuations in plant flow rate and in filtration rate. In addition, filter effluent control valves were malfunctioning and causing wild fluctuations in filtration rate. In one instance the effluent control valve readjusted the flow rate by 1100 gpm repeatedly in the span of a couple of minutes.

* Disinfection, chemical feed and flocculation basins were also identified as performance-limiting factors.

Mayor Albert Martens and City Council members June Clark, Bill Schwarzkoph, Larry Propp, and Don Seliski took an aggressive approach to facility upgrade. With the assistance of the operators, CPE results, and HKM engineers, they instituted a program of improvements. The changes made in one year are:

* Preventive maintenance program has begun. A new workroom for meter repair and spare parts is being constructed and the facility is getting a good coat of paint and excellent housekeeping.

* A new operator, Mr. Rich Woelich has been hired. He joins Dan Kennedy, Dave Wyrick, Bob Jacobsen, and Mike Hagel on the operations staff.

* Filtration rate is now controlled by new filter effluent valve controllers. The filters now operate as constant head - variable rate. New media was installed in all three filters. The backwash trough was raised 9 inches to make room for the new media. Damaged hydrocone underdrains were also replaced when the filters were down for rehabilitation. Two new air release valves were installed on the backwash line to prevent the introduction of air into the underdrain system. It is necessary to operate only two filters at a time to furnish the City's essential water demands. Filters #1 and #3 are operating with filter effluent turbidities of 0.031 NTU and 0.043 NTU respectively. Three Hach 1720C continuous monitoring and recording turbidimeters have been installed on the effluent pipes of each filter with digital read-outs in the lab. New surface wash jets have been installed on the filters.

* Attempts have been made to level the overflow weirs on the sedimentation basins to prevent short circuiting and reduce solids carryover onto the filters.

* Jar tests are being performed once per week; more often if necessary. Influent turbidities are measured manually one to three times per day.

* A new influent flow meter will be installed this summer or fall. They plan to install a continuous monitoring turbidimeter at this point too.

* The backwash flow indicator, clearwell level indicator, and total filter effluent flow indicator have all been digitalized.

* New chart recorder for influent and effluent flow rates.

* Fully automatic backwash procedure by Con Tro Flow.

Short range goals include:

- * improvements to the building such as insulation, windows, storm windows, heaters, sheet rocking, and painting
- * rebuild flash mixer
- * improvements to the chlorination system, including a new feeder, scales, auto switch-over, leak detector, and respiratory equipment
- * radio telemetry for reservoir level control
- * investigation of chemical addition for corrosion control
- * flow proportional alum, carbon and polyphosphate feeders
- * expansion and remodeling of laboratory area
- * new bench top turbidimeter
- * new air compressor
- * new effluent flow meter
- * overhaul flow meters for each filter
- * overhaul or replacement of flocculators
- * replacement of flocculation chamber mud valves

Long range goals are:

- * programmable controller for plant instrumentation
- * intake screens
- * expansion of the clearwell for increased chlorine detention time
- * expansion of the backwash sludge lagoons
- * calibration and overhaul of high service pumps
- * overhaul of one low service pump
- * baffling of flocculation chambers
- * replacement of tube settlers and weirs
- * sealing of sedimentation basins
- * and finally, an especially welcome item to operators and State inspectors.....AIR CONDITIONING IN THE LAB!!

The operators' application of treatment concepts and process control testing has improved greatly as evidenced by the consistently high finished water quality. Maintenance and administrators' familiarity with plant needs has also improved. Rehabilitation of the filters and other physical modifications mentioned above have drastically improved plant performance and operational flexibility.

The Mayor, City Council and the operators are commended for their efforts toward improved plant performance!

* * *

NITRATES IN GROUNDWATER:
Fertilizer or Fallow?

By: Tana Kappel, MSU News Service

Nitrogen fertilizer is getting a bad rap as a cause of water pollution in dryland farming areas in Montana, according to university scientists.

In fact, proper application of nitrogen fertilizer could reduce the flow of nitrates to the water table, say the Montana State University researchers.

News sources have cited nitrogen fertilizers as the source of high nitrate levels discovered in the water supplies of several small Montana communities, including Moore and Flaxville.

No harmful health effects have been reported in these communities. However, consumption of nitrate-contaminated water can decrease the blood's oxygen-carrying capacity, causing the skin to turn blue. The condition is most common in infants.

"The probability is very high that none of the nitrates in the water that supplies these communities is from nitrogen fertilizer," says Jeff Jacobsen, MSU Extension soils scientist.

Instead, the nitrates have been gradually building up in soil and water in some areas of the Great Plains since the advent of the summer fallow system and other modern farming practices, he says. "Only now are some of these nitrates beginning to reach domestic water supplies," says Jacobsen.

MSU Agricultural Experiment Station research conducted in the late 1960s bears this out. MSU soil scientist Hayden Ferguson tracked nitrates in the groundwaters of the Highwood Bench area northeast of Great Falls, and concluded that the nitrates could not have come from fertilizers.

Prior to the advent of dry-land farming, most of the nitrogen was contained in microorganisms, plant remains and soil organic matter. Each year bacteria in the soil converted some nitrogen to nitrates, but this small amount was quickly taken up by prairie grasses.

Farming, especially the summer fallow system, accelerated the release of nitrogen from soil organic matter, and increased the likelihood of nitrates leaching into groundwater.

"The release of plant nutrients, especially nitrogen, phosphorus and sulfur, from the high amount of organic matter of virgin soils is the reason excellent crops were grown without fertilization in the early days," says Jacobsen.

Better equipment and greater tractor power after World War II led to more water storage efficiency on fallow lands. As water amounts began to exceed the soil's storage capacity, the water slowly moved toward the water table, carrying nitrates with it.

Nitrates mix easily with water, says Jacobsen. "Any water and nitrate that moves beyond the root zone is on a slow, but one-way trip toward the groundwater," he says.

In irrigated or high precipitation areas, nitrogen fertilizer could be the source of nitrates, says Ferguson, Significant moisture received just after seeding, before plants are growing, could move the fertilizer, primarily nitrate, into groundwater. This could happen on the Great Plains during an exceptionally wet fall or spring, but it would be unusual, say the scientists.

In Montana, proper use of fertilizers might reduce nitrate movement to groundwater, since properly fertilized crops tend to root deeper and extract more water from the soil, says Jacobsen.

For information on proper fertilizer application or testing soil or water for nitrates, contact the MSU Extension Office in your county. Ask for Extension bulletins titled "Fertilizer Questions" or "Soil Testing Laboratories."

If testing reveals a nitrate problem, you can get more information from Jacobsen (406-994-5683) or the Water Quality Bureau of the Montana Department of Health and Environmental Sciences (406-444-2406).

ALUMINUM and ALZHEIMER'S

ANY CONNECTION?

EPA's Office of Drinking Water prepared the following statement in response to an article on a possible relationship between aluminum in drinking water and Alzheimer's Disease in England.

Recently, the Wall Street Journal (January 13, 1989, p. B2) published a story citing a British study linking levels of aluminum in drinking water with the incidence of Alzheimer's Disease. The British study was published in the January 9-13, 1989 issue of the Lancet. The authors surveyed 4,100 people aged 40 to 69 and reported an increased risk of developing Alzheimer's Disease in those consuming drinking water containing aluminum levels of 0.11 mg/L or greater. This is a surprising result since it is know that typical dietary exposures to aluminum salts average 20 mg/day. The question of a possible relationship between aluminum and Alzheimer's Disease has been raised before and the U.S. Environmental Protection Agency (EPA) has been evaluating that hypothesis.

Due to the inadequacies of the health effects data, EPA removed aluminum from the list of contaminants to be regulated by 1989 and placed it on a list being considered for regulation in 1991. Several issues on the toxicity, bioavailability and significance of exposure from a drinking water source remain that must be resolved prior to establishing whether there is a health basis for regulating aluminum in drinking water. A secondary standard of 0.05 mg/L, based on aesthetics is being proposed in the Federal Register this April. This level is consistent with a treatment related recommendation by the American Water Works Association (AWWA). The World Health Organization (WHO, 1984) had recommended an aesthetics based value of 0.2 mg/L. In keeping with the WHO and AWWA, EPA continues to recommend that the water suppliers operate their treatment systems such as to avoid unnecessary residual aluminum levels in finished drinking water. This practice would assure optimum aesthetic quality of the water and obviate any possible health concerns that might exist.

* * * * * * * * * * *

Join Now and Grow With Us

INDIVIDUAL

AMERICAN WATER WORKS ASSOCIATION MEMBERSHIP APPLICATION

Complete this form and mail to:
AWWA / 6666 W. Quincy Avenue / Denver, CO 80235 / (303) 794-7711

BSCWS

AWWA USE ONLY

PLEASE PRINT OR TYPE

LAST NAME ______ FIRST NAME (and middle initial) ______

MAILING ADDRESS ______

CITY ______ STATE OR PROVINCE ______ ZIP CODE ______

AREA CODE ______ TELEPHONE ______

TITLE ______

EMPLOYER'S NAME (if not already in mailing address) ______

APPLICANT'S SIGNATURE ______ DATE ______

SIGNATURE OF AWWA MEMBER ENDORSING APPLICATION (Optional) ______ ENDORSER MEMBER NUMBER ______

ANNUAL DUES $______

NEG Assessment* ______

Multi-Section Option (other than own) ______

Total Due $______

Check One	Grade Code	Annual Dues
☐ Active	02	$58.00
☐ Affiliate (Strictly for operator-level personnel or employees of small utilities)	06	27.00
☐ Student (Must be enrolled and carrying at least 10 credit hours)	14	20.00

*Applicants with an address in the New England Section (ME, NH, RI, VT, MA) are required to include an assessment of $26.50 with their AWWA dues. Multi-section membership on reverse side.

Make check payable to AWWA (Canadian funds add 15%)

☐ American Express ☐ Diner's Club ☐ MasterCard ☐ Visa

Credit Card No. ______

Exp. Date ______

☐ Send invoice

If you have been a member of AWWA before, indicate dates here: ______

ALL APPLICANTS SHOULD COMPLETE THIS SECTION:

Circle the descriptions below that best describe you. The information is used in audits of AWWA readership. Circle only ONE in each group.

1. BUSINESS AND INDUSTRY
- A. Public Water Supply Utility – Municipally Owned
- B. Public Water Supply Utility – Investor Owned
- C. Governmental – Federal, State, Local
- D. Consultant
- E. Contractor
- F. Private Industrial Systems or Water Wholesaler
- G. Manufacturer of Equipment & Supplies Including Representatives
- H. Distributors of Equipment & Supplies Including Representatives
- I. Educational Institutions, Faculty and Students, Libraries, and Other Related Organizations
- J. Fully Retired
- K. Research Labs

2. JOB TITLE
- A. Executive – Gen'l Mgr., Commissioner, Board Member, City Mgr., Mayor, President, Vice-President, Owner, Partner, Director, etc.
- B. Management – Division Head, Section Head, Mgr., Chief Engineer, Comptroller, etc.
- C. Engineering/non-managerial – Civil Engr., Mech. Engr., Envir. Engr., Planning Mgr., Field Engr., Systems Designer, etc.
- D. Scientific/non-managerial – Chemist, Biologist, Biophysicist, Researcher, Analyst, etc.
- E. Purchasing – Purchasing Agent, Procurement Specialist, Buyer, etc.
- F. Operations – Foreman, Operator, Maintenance, Crewman, Service Rep., etc.
- G. Marketing & Sales/non-managerial – Mkt. Analyst, Mkt. Rep., Salesman, Sales Rep., etc.
- H. Other (describe) ______

______

CHECK FIELD(S) SERVED:
- 5 ☐ Water Supply Only
- 7 ☐ Wastewater Only
- 9 ☐ Both
- 3 ☐ Other

In some AWWA sections, a portion of the section allotment equal to 50 percent or more of the domestic subscription rate charged for the section periodical will be allocated toward a subscription of that periodical.

Dues allocated for each publication members receive:
Journal $25
Mainstream $6
OpFlow $5
Waterworld News $5

Membership Application

Water Pollution Control Federation

601 Wythe Street
Alexandria, Virginia 22314-1994

Association

Montana Water Pollution Control Association

Use this application to join the Water Pollution Control Federation and your local Member Association. Simply complete this application and return it to the address below. Along with your monthly publications, you are also entitled to group insurance, technical assistance, discount on technical publications, and much more!

Please print.

First Name, Middle Initial (11) — Last Name (16) — (Jr., Sr., etc.) (3)

Mailing address ☐ Business or ☐ Home

Business Name (if applicable) (30)

Street or P.O. Box (30)

City (20) — State (2) — Zip Code (9)

Area Code—Telephone (10) — Country (If Outside U.S.) (16)

WPCF Sponsor (Not Required) (28) — Sponsor's Member I.D. Number (6)

Employer Code (2)

11 - Local/Regional Government/Agency
13 - State/Interstate Government/Agency
16 - Federal Government/Agency
21 - Consulting Firm (Engineering/Other)
25 - Wastewater Equipment/Material/Supplier
27 - Industry
28 - Construction Contractor
31 - Educational Institution
61 - Other (Please specify): ____________

Education Code (1)

1 - Less than High School
2 - Training Courses, Short School
3 - High School
4 - Attended College
5 - Completed Junior College
6 - Bachelor's Degree
7 - Advanced Degree

Membership Categories

	☐ **Active**	☐ **Operations Division**	☐ **Student**	☐ **Corporate**
	For individuals involved or interested in the advancement of knowledge pertaining to water quality.	For individuals working on a day-to-day basis (or retired from) in a wastewater collection, treatment, or laboratory facility.	For individuals enrolled at least half-time in a college or university.	For companies engaged in the design, construction, operation or management of water quality systems.
Dues	$ 55.00	$ 22.50	$ 19.50	$ 180.00
Journal	Included	☐ $30.00	Included	Included
Highlights	Included	☐ $15.00	Included	Included
Forum	☐ $12.50	Included	☐ $12.50	Included
TOTAL	$ ______	$ ______	$ ______	$ ______

Method of Payment

☐ Check Enclosed—Make check payable to WPCF.

☐ Charge my ☐ VISA ☐ MasterCard ☐

Account Number ______________________ Exp. Date ______

Signature ______________________ ( ) Daytime Phone No. ______

Send Completed Application and Payment to:

WPCF, Member Records
601 Wythe Street
Alexandria, Virginia 22314-1994

For more information, call (703) 684-2452

Postal Requirement: Dues allocated for publications when included in membership: *JWPCF* — $15; *Highlights* — $3; *Operations Forum* — $5.

MSAWWA/MWPCA OFFICERS AND COMMITTEES

AWWA and WPCF committees are composed of volunteers from all aspects of water and wastewater professions. Committee work keeps our organizations functioning and is directly responsible for the many benefits of Montana's section activities.

If you would like to serve on a committee, or make recommendations to their members, here they are!

MWPCA Board of Directors/Executive Committee:

National Director - Kristi Kline, City of Havre WWTP
President - Tim Hunter, City of Missoula Sewer Division
President Elect - Barry Damschen, Damschen and Associates, Helena
Vice President - Mark Richardson, City of Miles City
Senior Trustee - Howard Peavy, Montana State University
Junior Trustee - Scott Anderson, Water Quality Bureau
Executive Secretary - Ray Armstrong, HKM Associates, Billings
PWOD Director - Darrell Langford, City of Helena WWTP

MSAWWA Board of Directors/Executive Committee:

National Director - Ralph Dunahoo, Conrad Public Works
Past Chairman - Denise D. Ingman, DHES, Helena
Chairman - Gerald L. Lukasik, Mountain Water Company, Missoula
Chairman Elect - Terry Richmond, Morrison-Maierle/CSSA, Kalispell
Vice Chairman - Dan L. Fraser, Water Quality Bureau
Senior Trustee - Jim Kaercher, HKM Associates, Billings
Junior Trustee - Steve Ruhd, City of Conrad
Secretary-Treasurer - Paul Torok, Seeley Lake Water District

MSAWWA/MWPCA Joint Committees (1989-1990)

Safety & Heroism - George Wilson, Terry Richmond, Dick Pedersen
Resolutions - Mark Richardson, Tim Berry
Host City Committee - Howard Peavy, Bob Hunter
Publications & Technical Papers - Michele Wityk, Denise Ingman, David Duke, Mike Garrity, Donna Howell
Program - Bob Hunter, Jim Kaercher, Barry Damschen, Doris Roberts, Mike Patterson, Joe Steiner, Gerald Gaston, Dan Fraser
Sections Directory - Jan Cranor, Mike Patterson, Paul Torok, Ray Armstrong
Historical - Tim Berry, Ralph Dunahoo, David Haverfield
Scholarship - Henry Elbrecht, Kristi Kline, Terry Richmond, Martha Dow
Government Affairs - Jim Melstad, Lyle Meeks, Scott Anderson, Dean Chaussee
Manufacturer Representatives - Jerry Eastmark, Mike Richards, Bill Haldane, Phil Eve, Rob Balderson
Public Information - Al Towlerton, Mark Richardson, Shelley Nolan, Lyle Meeks, Curtis W. Myran

MSAWWA/MWPCA Joint Committees (1989-1990) (cont.)

Education - Steve Ruhd, George Wilson, Jim Kaercher, Kristi Kline, Jan Cranor, Barry Damschen, Denise Ingman
Nominations - Dick Pederson, Scott Anderson, Tim Hunter, Gerald Lukasik, Lyle Meeks, Ralph Dunahoo, Terry Richmond, Dave Duke, Denise Ingman
Auditing - Dan Fraser, Mark Richardson

1989-1990 AWWA Fuller Award Committee

Mike Thomas, Billings Public Utilities
Richard A. Nisbet, Helena Public Works
Dan Fraser, Water Quality Bureau
Tim Berry, Morrison-Maierle/CSSA, Helena
Robert G. Millons, Helena

1989-1990 MSAWWA Small Systems Committee

Bob Kruse, City of Red Lodge
Al Tudor, Morrison-Maierle/CSSA, Kalispell
Allen Sloan, Confederated Tribes T O M
Al Towlerton, City of Billings
Ralph Dunahoo, Conrad Public Works
Wesley Gilbertson, Polson
Dave Haverfield, Missoula County RSID #901
Stan Nelson, Stan's Repair, East Glacier
Bill Hunt, Montana State University
Dave Duke, St. Labre School District
Jim Kaercher, HKM Associates, Billings

1989-1990 MSAWWA Membership Committee

Donna Howell, Water Quality Bureau
Michele Wityk, Robert Peccia & Associates, Helena
George Wilson, City of Columbia Falls

1989-1990 MSAWWA Honors & Awards Committee

Terry Richmond, Morrison-Maierle/CSSA, Kalispell
Ray Wadsworth, MT Rural Water Systems
Denise Ingman, DHES, Helena
Mike Thomas, Billings Public Utilities
Paul Torok, Seeley Lake Water District

1989-1990 MWPCA Honors & Awards Committee

Dick Pederson, Water Quality Bureau
Scott Anderson, Water Quality Bureau
Tim Hunter, City of Missoula Sewer Division
Joe Steiner, City of Billings
Kristi Kline, City of Havre WWTP

MONTANA ASSOCIATION
OF COUNTY WATER &
SEWER DISTRICTS
POST OFFICE BOX 218
FLORENCE, MONTANA 59833

by John Kellogg, Executive Director

Montana Association of County Water and Sewer Districts (MACW&SD) is a non-profit corporation formed in mid-1988 to serve Montana's county water and sewer districts. In response to a need expressed by the districts to seek better management of their resources and facilities, the Association has been taking on some major tasks in its brief history.

The first concern was to offer training for board members who wanted to better understand what techniques of management and accounting would benefit them. The "Boardsmanship Training Seminars" have been conducted in the locality of the district, with attention given to the special issues of concern to the board. These seminars will continue through next spring. If you are interested in scheduling one, contact Judy Sass at 273-0410.

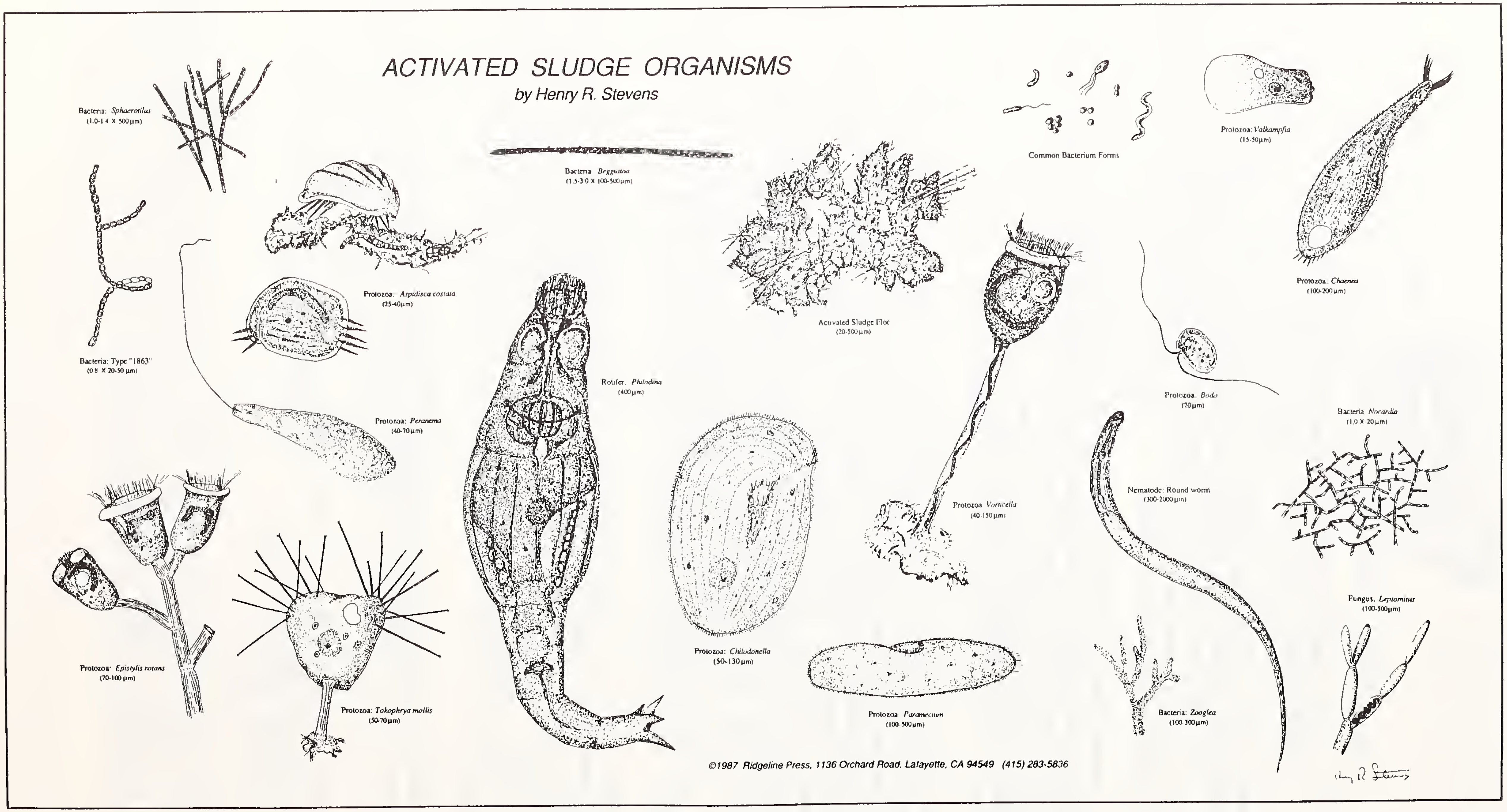
The second major concern of the Association centers on insurance and its availability to water and sewer districts. Due to a number of problems, including changes in State legislation, districts have been left with uncertain and often unaffordable insurance. Underwriters have cancelled coverage to some of the small districts, leaving them with the option of raising rates to meet the increased costs, or else going without coverage. The prospect of being without coverage is alarming, especially when more and more cases point to the responsibility and liability of the district and its board for actions it takes or fails to take in carrying out its business. The Association has been working to find a solution to this problem, either through enabling the districts to join an existing pool, or else forming a new one. While progress has been slow, we are intent on resolving the issue within the next year.

A third major focus of the Association revolves around communication and the spread of news. A quarterly newsletter is distributed to the districts, covering some of the important issues affecting the operation and financing of water and sewer systems. The Association library includes some concise and current manuals, booklets and videotapes on rate structures, elections, bookkeeping, hiring engineers, public relations and financial resources, as well as other topics.

This past March the Association opened an office in Florence to make these resources more readily available to districts. The address and telephone number are:

Montana Association of County Water & Sewer Districts
P. O. Box 218
Florence, Montana 59833
(406) 273-0279

We are looking forward to some active work in legislative lobbying, assisting districts in public relations, and through our relationship with Midwest Assistance Program, passing along technical advice to system operators. We encourage districts to join us now in this effort.



ACTIVATED SLUDGE ORGANISMS

by Henry R. Stevens

©1987 Ridgeline Press, 1136 Orchard Road, Lafayette, CA 94549 (415) 283-5836

Henry R. Stevens

This is a reproduction of a 19" x 33" ink sketch art poster. The artist, Henry R. Stevens, is a Biologist at the Sacramento Regional Wastewater Plant. Copies of the poster are available for $10 plus $3 postage and handling from: RIDGELINE PRESS, 1136-W Orchard Road, Lafayette, CA 94549.

The Case of the Disappearing Sludge

By: Tim Hunter, Superintendent
City of Missoula Sewer Division

The City of Missoula operates its activated sludge treatment system utilizing a constant total sludge unit (TSU) system. A target TSU is chosen and wasting is adjusted daily to attempt to maintain this target. The target is changed periodically to achieve optimum treatment performance during all times of the year and to match changing conditions of operation.

The City of Missoula supports a major population segment which varies significantly depending on the time of year. This is due to students at the University of Montana, who leave town for breaks or at the end of the school year. Their population fluctuation has a marked impact on loading at the treatment plant and the target TSUs needed to match the loading.

Other factors which impact the TSU target include water temperature, industrial loading, and sidestream loading. For example, we maintain fewer units in the system during the warm summer months because the warmer water increases biomass activity. A relatively higher number of units are maintained in the system when we are operating plant processes which contribute high loads via sidestreams reentering the treatment system.

During the fourth week of March, 1989, our target was 7.5 total sludge units. The units began dropping and we cut back on our wasting to maintain the target. At first, we attributed this decrease in total sludge units to the fact that the students had gone on spring break. When the units continued to drop, we became suspicious. A local industry, a known contributor of high strength organic waste, was contacted to see if they had changed their normal loading to the sewer system. They indicated "business as usual." Something else had to be happening.

Several of the plant operators noticed an unusual situation in the valve pit adjacent to one of the three secondary clarifiers. The bottom of the pit was filled with what appeared to be return activated sludge (RAS). One of the plant drain lines was checked and it, too, was flowing with the same sludge material. Samples were taken which confirmed that this stuff looked an awful lot like RAS.

We concluded that the problem could very well be that RAS was leaking out of the valve pit and into the plant drain line. This sludge was apparently going through the headworks and into the primary clarifiers where it was being removed with the primary sludge. Our activated sludge was constantly and automatically being removed from the system via the primary clarifiers!

A quick look at the blueprints confirmed that this was indeed possible. We stopped the flow to this clarifier and decided to dewater it and repair the problem the next day. Luckily, we had a beautiful, warm day to complete the work. By working as a team, we were able to repair the problem and place the clarifier back into service before quitting time.

We were not out of the woods yet, however. Our TSUs had dropped from the target of 7.5 units to a low of 4.0 units during the six days when we were loosing sludge. Our mixed liquor suspended solids were dangerously low (approximately 900 mg/l), and guess who would be coming back to town from their spring break in the next few days! We were on the verge of not having enough units in the system to treat the increased loading that the return of the students would bring.

The days which followed brought some turbidity in our effluent, and an increase in TSS and BODs was noted. We never approached our discharge permit levels and, to our surprise, the system quickly recovered. Our total sludge units were back up to our target within a week, and soon the effluent was looking better.

A major plant upset could have resulted from this incident. Instead, it was a minor problem. The plant staff should be commended for keeping such close tabs on the treatment system, for investigating this unusual circumstance, and for pitching in and helping to make such a quick repair possible.

The operators have been thinking about this incident and have come up with an interesting idea. Normally, our waste-activated sludge goes into a conditioning tank followed by a dissolved air flotation thickener, and the thickened sludge is then pumped into the anaerobic digesters. However, for the six days when we were losing sludge, the wasting and the thickener were shut down. We were able to decrease our TSUs by unintentionally wasting to the primary clarifiers. What if we were to do this intentionally? Could we possibly shut the thickeners down altogether? We plan to investigate this possibility.

EPA PROMULGATES THE TOTAL COLIFORM RULE and SURFACE WATER TREATMENT RULE

On June 29, 1989 the Environmental Protection Agency (EPA) released the final rule governing total coliform bacteria (including fecal coliforms and Escherichia coli), and the Surface Water Treatment Rule. These rules were promulgated under the federal Safe Drinking Water Act as amended in 1986. The rule is effective December 31, 1990, but may be adopted by Montana prior to that date.

In order to maintain primary enforcement responsibility over the Safe Drinking Water Act Montana must adopt regulations no less stringent than those promulgated at the federal level, although we may be more strict. With that in mind, you can figure public water supplies in Montana will at least have to comply with the rules outlined on the following pages.

Total Coliform Rule

This rule applies to all public water supplies and describes maximum contaminant levels, monitoring requirements, and analytical requirements. A partial summary of the final rule is as follows:

o Compliance is based on presence/absence of total coliform density, rather than an estimate of coliform density.

o MCL for systems analyzing at least 40 samples/month: no more than 5% of the monthly samples may be coliform-positive.

o MCL for systems analyzing fewer than 40 samples/month: no more than 1 sample/month may be total coliform-positive.

o A public water system must demonstrate compliance with the MCL for total coliforms each month it is required to monitor.

o MCL violations must be reported to the State no later than the end of the next business day after the system learns of the violation.

o Each public water system must sample according to a written sample siting plan. Plans are subject to State review and revision.

o Monthly monitoring requirements are based on population served. Roughly one sample per 1000 population is required.

o A system must collect a set of repeat samples for each total coliform-positive routine sample and have it analyzed for total coliforms. At least one sample must be from the same tap as the original sample; other repeat samples must be collected from within 5 service connections of the original sample. At least one must be upstream and one must be downstream. All repeat samples must be collected within 24 hours of being notified of the original result, except where the State waives this requirement on a case-by-case basis.

o Repeat sampling requirements now also include additional samples collected the month following the original contaminated sample and check samples. The table below specifies sample numbers for this requirement.

# Routine Samples/Month	# Repeat Samples	# Routine Samples Next Month
1 or less	4	5
2	3	5
3	3	5
4	3	5
5 or more	3	as per normal

o If total coliforms are detected in any repeat sample, the system must collect another set of repeat samples, as before, unless the State has been notified and the State has reduced or eliminated the need for the remaining repeat samples.

o If any sample is total-coliform positive, the system must analyze that total-coliform positive culture to determine if fecal coliforms are present. If any repeat sample is fecal coliform positive, or if a fecal coliform-positive original sample is followed by a total coliform-positive repeat sample the system is in acute violation of the MCL for total coliforms and the public must be notified by electronic media.

o Samples which have heavy heterotrophic plate count growth (non-coliform bacteria), but no coliforms detected, must resample the water system for total coliforms.

This summary is not a complete review of the federal rule. Copies of the complete rule are available through the Safe Drinking Water Act Hotline (800-426-4791) by ordering the June 29, 1989 Federal Register (40 CFR Parts 141 and 142).

Surface Water Treatment Rule

This rule promulgates national primary drinking water regulations for public water systems using surface water sources or ground water sources under the direct influence of surface water. Ground water sources under the influence of surface water include those supplies which have significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia*. Direct influence will be determined on a case-by-case basis and must be completed by June 1993 for Community supplies.

The basis of the surface water treatment rule is to ensure supplies achieve at least 99.9% removal and/or inactivation of *Giardia* cysts, and at least 99.99% removal and/or inactivation of viruses.

Public water systems which use filtration must report to the State on a monthly basis information regarding filtered water turbidity, disinfectant residual concentration in the water entering the distribution system, and disinfectant residual concentrations and/or HPC measurements in the distribution system. Systems must also report waterborne disease outbreaks, turbidity measurements over 5 NTU,and failure to maintain a disinfectant residual of 0.2 mg/l at the point of entry to the distribution system for more than 4 hours.

For both filtered and unfiltered surface water systems turbidity measurements must be performed and recorded every four hours that the system serves water to the public. Conventional and direct filtration facilities must maintain filtered water turbidity levels less than or equal to 0.5 NTU 95% of the time. Unfiltered supplies and technologies such as slow sand filtration or diatomaceous earth filtration are allowed less than or equal to 1 NTU 95% of the time.

Criteria to avoid filtration are essentially as previously proposed. Systems which do not install filtration must meet strict raw water quality and monitoring requirements, watershed control agreements, and treatment by disinfection with an array of back-up systems and/or automatic system shut-down.

The complete Surface Water Treatment Rule is available from the Safe Drinking Water Act Hotline (800-426-4791). The rule defines disinfectant concentration and contact time (CT) requirements which are too voluminous for this Big Sky Clearwater issue.

Although both of these rules are considerably more stringent than the rules currently in place, they are also less stringent than originally proposed. This relaxation of the proposed rules is due largely to the number of letters and comments EPA received from concerned public water suppliers and citizens. Several hundred comments were received from Montana alone. Since these rules are only the beginning of the implementation process for the Safe Drinking Water Act, we encourage you to keep abreast of the proposals as they become available and let EPA know where we stand! The rules are to hit small systems the hardest, and in Montana than means all but 23 of our over 2700 public water supplies.

DRINKING WATER STANDARD SETTING

SCHEDULE*

Contaminant/Requirement	Final Rule**	Effective Date***
Fluoride	4/86	10/87
Lead Ban (SDWA 1417)	6/86	6/86
Phase I Volatile Organics	6/87	1/89
Public Notification	10/87	4/89
Lead Ban Policy Guidance	9/88	3/89
Surface Water Treatment Rule	6/89	12/90
Total Coliform Rule	6/89	12/90
Lead/Copper	12/89	6/91
Phase II, 38 Contaminants	12/90	6/92
Phase III, Radionuclides	Fall 90	Spring 92
Phase IV, Disinfection	Winter 91	Summer 92
Phase V, 25 Contaminants	Winter 90	Summer 91
Phase VI, 1st List	Winter 91	Summer 92
2nd List	Winter 94	Summer 95

* As of June 1989.

** All dates after June 1989 are estimated.

*** EPA rules are generally effective 18 months after being finalized. State rules are required to be adopted by the EPA effective date.

The Montana Environmental Training Center Moves Ahead

On June 28, 1989, the Advisory and Steering Committee of the Montana Environmental Training Center (METC) met at the Great Falls Vo-Tech Center. The function of the Advisory Committee is to review METC activities, offer recommendations for training improvement, and provide dates and locations of seminars that the organization will include on the training calendar.

Topics discussed at the meeting were: policy and procedures, role and objectives of the Advisory Committee, budget, training calendar, Advisory Committee involvement, marketing of METC, and future directions. Members of the Advisory Committee made suggestions on how they can best carry out their functions. They also proposed that the Advisory Committee include people from more training agencies in the State.

The next meeting of the METC Advisory Committee is set for this coming fall. If you would like to input your ideas on training, please contact a member of the METC Advisory and Steering Committee.

Here is the METC Advisory Committee!

Sitting (L-R): Rosemary Fossum, Kristi Kline, Bob Kruse
Standing (L-R): Tim Hunter, Ray Wadsworth, Dick Pedersen, Doris Roberts, Martha Dow, Mark Richardson, Alan Jackson
Not Pictured: Barry Damschen, Howard Peavy, Paul Torok, Bill Leonard, Donna Howell, Scott Anderson

METC UPDATE

By: Dick Pedersen
Water Quality Bureau

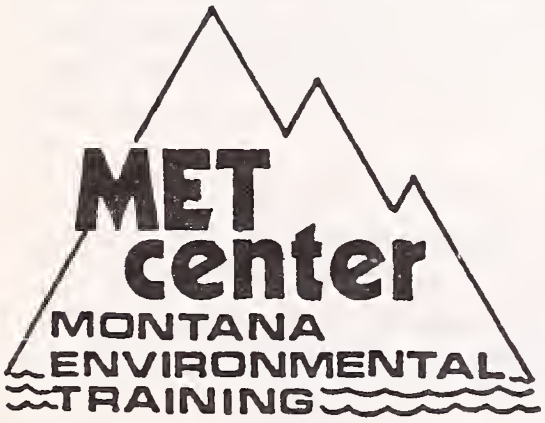
In the last issue of the Big Sky Clearwater I described for you the Montana Environmental Training Center (METC) and how it affects you. Since that time, METC has sponsored several workshops throughout the state. These have included: Hydraulics and Pumps, Turbidity and Surface Water Treatment, Basic Water and Wastewater, Troubleshooting Lagoons, Lagoon Operation and Maintenance, Emerging Technologies in Drinking Water Treatment, Distribution and Collection Systems, and Microbiological Process Control in Activated Sludge. All of these workshops were well attended, with a total of 275 participants as of July 1st.

METC has purchased several pieces of equipment to aid in training. Computer equipment has been obtained to streamline and keep better records of training activities. New slide-making equipment will allow trainers to put together more professional presentations. Lab equipment has been ordered to use for hands-on training in laboratory procedures. A recently obtained van will transport training equipment to workshops, and will also carry some of the resource library materials which you will be able to check out.

We have begun to develop handouts and instructional materials to utilize in training. Our first target topic is Cross Connections and Backflow Prevention. By October of this year we hope to have some good information for you on this topic. You can look forward to interesting Cross Connections and Backflow Prevention workshops next year.

The first get-together of the METC Advisory Committee took place on June 28th. The Advisory Committee reviewed METC activities and discussed and recommended training workshops and ideas for METC consideration. Participation of the Advisory Committee is critical to the success of METC.

Remember, METC is an organization for you. Your participation and involvement are necessary for a successful training program. If you have any suggestions, questions, or recommendations, please do not hesitate to call Martha Dow or Doris Roberts at 265-3757, or Dick Pedersen or Donna Howell at 444-2406.



The Montana Environmental Training Center has adopted the logo at left. The logo was designed by Ronald Del Carlo, a drafting student at NMC, and was submitted as an entry in the METC Logo contest which was announced in the spring issue of the Big Sky Clearwater. Several very creative ideas were submitted to the steering committee of the Montana Environmental Training Center for consideration. The final selection was made by a committee vote. The symbol will be used to identify environmental training activities of the Montana Environmental Training Center which is an organization to develop, promote and implement effective training for the water and wastewater profession.

MINI CIP HANDBOOK TO BE AVAILABLE IN DECEMBER FOR USE BY SMALL TOWNS, WATER/SEWER DISTRICTS AND CONSUMERS

By: Robb McCracken
Community Development Block Grant Program, Department of Commerce

The Department of Commerce Community Technical Assistance Program and the Community Development Block Grant Program are sponsoring a project to assist small towns and their engineering and financial consultants with the preparation of financing plans for improvements to drinking water systems, wastewater collection systems and street/road systems. Called the Mini Capital Improvements Plan (MINI CIP), it is a system and model process to help small towns identify repair/replacement needs, set repair priorities, identify financial options, set up financial depreciation/replacement schedules, educate the public as to the benefits of the proposed improvements, and, ultimately, finance and build the necessary improvements.

The information will be available in a step-by-step illustrated handbook. Workshops and individual technical assistance will be offered in the future.

The Capital Improvements Planning process is a proven technique that has been used by many major cities in the United States and elsewhere for public works improvement financing for over 50 years. For a variety of reasons the CIP process has not been available to most small towns. The Mini CIP can help municipalities and water/sewer districts save money through innovative needs assessment methods, cost/benefit analysis for prioritizing water and sewer main replacement, comprehensive financial research, and creation of financial depreciation/replacement schedules.

The project has included the participation and support of the Montana Water Quality Bureau. In particular, Scott Anderson of the Wastewater Construction Grants and Loans Program and Dan Fraser of the Municipal Drinking Water Program have been actively involved in the preparation of the replacement needs assessment section of the handbook. Alan Jackson of Montana State University has provided both financial and technical assistance for the street/road section of the project. Many other local and state individuals and organizations have lent their expertise and support.

Consultants for the project are Lyle Meeks, P.E., Neil Consultants, and Clete Daily, P.E., of Daily Associates. Details on the Mini CIP will be provided in future issues of "Big Sky Clearwater." For further information, contact: Robb McCracken, Montana Department of Commerce, CTAP, Cogswell Bldg., Room C211, Helena, Montana 59620.

56TH ANNUAL SCHOOL

WATER AND WASTEWATER OPERATORS AND MANAGERS

DATES:	September 25 through September 28, 1989
PLACE:	Strand Union Building, Montana State University
REGISTRATION:	8:00 to 9:30 a.m. on September 25 (**NO PREREGISTRATION**)
CEC's:	up to 2.5

We are pleased to announce the Fifty-sixth Annual Operators School to be held September 25 through September 28, 1989 at Montana State University in Bozeman, Montana. This year's school will include a wide variety of topics presented by experts in the field. In addition to the general sessions, sessions for operator study (SOS) have been scheduled. The SOS will offer individual instruction in solving math and hydraulic problems encountered in the day-to-day operation of water and wastewater systems. All of the sessions will be of great help to those planning to take the Operator's Exam on Friday, September 29, or at other scheduled times throughout the year.

The operator certification exam is administered separately from the Operator's School. You do not have to take the exam if you attend the Operator's School, nor do you have to attend the Operator's School in order to take the exam. However, you should find the exam much easier after four days of participation at the school. If you wish to take the exam, you must contact Rosemary Fossum, DHES, Water Quality Bureau, Cogswell Building, Helena, Montana, 444-2691.

As a reminder, attendance at the Operator's School will satisfy the continuing education credits required by June 30, 1990 for all operators.

This year's registration fee is $50. Checks and purchase orders should be made payable to Montana State University and brought to the school. There is no preregistration. This year's school will be held in the Strand Union Building (SUB). Each person will have to make his/her own arrangements for lodging and meals.

We are expecting an informative, useful and exciting school this year. Hope to see you there!

For further information contact:

Dick Pedersen or Dave Aune
Water Quality Bureau
Department of Health and
Environmental Sciences
Cogswell Building
Helena, MT 59620
444-2406

Howard Peavy
Department of Civil and
Agricultural Engineering
412 Cobleigh Hall
Montana State University
Bozeman, MT 59717
994-6690

FIFTY-SIXTH ANNUAL SCHOOL
WATER AND WASTEWATER OPERATORS AND MANAGERS
September 25 - 28, 1989

MONDAY - 9/25/89

8:00 - 9:30	Registration
9:30	Welcome from MSU Welcome from DHES Operator Certification - CEC Program School Logistics
10:15	Microbiology for Water and Wastewater Operators
11:00	Water-borne Diseases
11:45	Lunch

	JOINT		JOINT
1:00	Operation and Maintenance of Distribution and Collection Systems	1:00	Basic Math for Operators
3:00	Break	3:00	Break

JOINT SESSION

3:15	Backflow and Cross Connections
4:15	Session for Operator Study (SOS)
4:30	Happy Hour - Hosted by AWWA-WPCF

TUESDAY - 9/26/89

	WASTEWATER		WATER		JOINT
8:00	Biological Process Control	8:00	Filtration Processes	8:00	Chlorination
		9:00	Polymers		
10:00	Break	10:00	Break	10:00	Break
10:30	Biological Process Control (cont.)	10:30	Alternatives to Chlorine Disinfection	10:30	Recordkeeping
11:45	Lunch	11:45	Lunch	11:45	Lunch
1:00	Digester Operation (Aerobic and Anaerobic)	1:00	Water Treatment Plant Process Control	1:00	Well Construction, Operation and Maintenance
		2:30	Conrad - A Treatment Improvement Success Story		
3:00	Break	3:00	Break	3:00	Break

3:15	Safety in Water and Wastewater	3:15	Safety in Water and Wastewater	3:15	Safety in Water and Wastewater
4:00	SOS	4:00	SOS	4:00	SOS

WEDNESDAY - 9/27/89

	WASTEWATER		WATER		JOINT
8:00	Use of Special Studies to Optimize Plant Performance	8:00	Regulations Affecting Public Water Supplies	8:00	Lagoons: Theory of Operation, Design and Construction
		9:00	Coliform Samples and Significance		
		9:30	Plan Review and Approval Process		
10:00	Break	10:00	Break	10:00	Break
10:30	Solids Dewatering	10:30	Biofilms in Distrib. System	10:30	Lagoon Operation and Maintenance
		11:15	Groundwater Contamination		
11:45	Lunch	11:45	Lunch	11:45	Lunch
1:00	Understanding pH	1:00	Turbidity Measurement	1:00	Use of Pesticides and Herbicides
2:00	Wastewater Compliance Inspections	2:00	Preventive Maintenance	2:00	Planning and Financing Major Improvements
3:00	Break	3:00	Break	3:00	Break
3:15	Construction Inspection	3:15	Construction Inspection	3:15	Construction Inspection
4:15	SOS	4:15	SOS	4:15	SOS

THURSDAY - 9/28/89

8:00	Pump Alignment
10:00	Break
10:30	Energy Savings at Water and Wastewater Facilities
11:30	Wrap-up
1:00	SOS

FRIDAY - 9/29/89

CERTIFICATION EXAM

EXAMINATION NOTICE

ON FRIDAY---------------SEPTEMBER 29, 1989--------------8:30 A.M. TO 12:30 P.M.

examinations for certification as a Water Distribution System Operator, Water Plant Operator, and Wastewater Plant Operator will be administered in BALLROOM C of the STRAND STUDENT UNION, MSU, BOZEMAN.

The examinations will be given at the conclusion of the annual Water School jointly sponsored by the Water Quality Bureau and Montana State University and held on the MSU campus September 25-28. Attendance at the school is not required in order to take a certification examination. However, anyone planning to take an examination must complete a certification application AND examination registration slip before September 15, 1989, and send it to:

Water/Wastewater Operator Certification
Water Quality Bureau - Room A206 - Cogswell Building
Helena, Montana 59620 (Phone: 444-2691)

Annual fees for fiscal year 89/90 payable with the application are:
Class 1 - $27; Class 2 - $22; Class 3 - $17; Class 4 - $12; Class 5 - $10.
Make checks payable to DHES, OPERATOR CERTIFICATION. No pre-registration is required for Water School. Fees for the school are payable to MSU at the time of registration on September 25.

Those who have previously submitted certification applications and fees for fiscal year 89/90 will need only to submit EXAMINATION REGISTRATION SLIPS (detachable below) with a fee of $5 per examination. PLEASE RETAIN THE UPPER PORTION OF THIS NOTICE. For application materials or information, contact the address or phone listed above.

EXAMINATION REGISTRATION SLIP

(Detach and return with $5 per exam by September 15, 1989)

On September 29, 1989, I will take the examination(s) I have checked below:

Type	Class:	1	2	3	4	5
Water Distribution (A)		___	___	___	___	___
Water Plant or Well (B)		___	___	___	___	
Wastewater Plant (C)		___	___	___	___	

*Note: Combination examinations are offered for 2A3B, 3A4B, 4AB, and 5AB and require $5 examination fee only.

NAME:_______________ADDRESS:_______________SYSTEM:_______________

☆ ☆ ☆ SPECIAL STUDIES ☆ ☆ ☆

By: Dick Pedersen
Water Quality Bureau

A goal of water and wastewater treatment facilities is to produce the best possible finished water quality for the public and the best possible quality of effluent discharge from a wastewater treatment plant. Unfortunately accomplishing this goal is not an easy task. This is understandable given the complexity of treatment facilities and unit process features which are sometimes unique to the facility.

Operation and maintenance manuals or manufacturer's manuals are a source for general guidance on operational techniques, but it seems the "text book" does not always apply or produce expected results. In addition, we must keep in mind that our facilities consist of many unit processes, and operational changes on one particular unit may have beneficial or detrimental effects on overall treatment.

One method of achieving the goal is to conduct special studies to determine optimal performance of unit processes and overall impact on water or wastewater treatment at the facility. Often we say "Oh I've tried that," or "That doesn't work at my plant," but rarely is there documented evidence that supports these claims. Special studies are designed to systematically and scientifically prove or disprove a hypothesis or an assumption concerning operation, treatment, or performance. Once a special study is completed and documented, results can be applied to the operation of the treatment facility and result in improved overall performance. Other side benefits are that special studies become a motivational tool for plant staff; special studies become a basis for on-going training; results of special studies are convincing to outside observers; and special studies go beyond research to provide valuable information concerning the treatment facility.

There is a very rigid format for conducting special studies that when followed produces desired results. There are six basic steps to conducting a special study:

1. HYPOTHESIS - A hypothesis is basically an assumption on how something will respond to a change. For instance: "Decreasing decant in my anaerobic digester will improve BOD removal across my primary clarifiers," or "Increasing my polymer concentration will improve flocculation." In order to begin a special study one must develop an hypothesis. Although this sounds simple it often is the most difficult step. The hypothesis must be clear and narrow enough in scope that it can be proven or disproved. Another difficult task is deciding on which hypothesis to use as a special study. You must set priorities at your facility which result in the hypothesis with potentially the greatest impact being tested first. It is important at this point to involve plant staff and discuss special studies and target hypothesis.

2. APPROACH - After determining the target hypothesis, a special study approach must be developed. Conducting a special study often involves sampling and testing that deviates from normal routines. This requires that the plant staff develop an approach on paper that clearly defines what additional sampling and testing is to be performed. This allows you to work out a lot of "bugs" on paper before actually implementing the special study.

3. DURATION OF STUDY - After a study approach has been developed you must define the end point or the duration of the study. One important aspect of defining an end point is it forces patience in conducting the special study. This is especially important in wastewater plants that have biological processes that sometimes require three-to-five mean cell residence times to produce a change. Sometimes routine work must be temporarily deleted to accommodate the requirements of the special study. By defining an end point plans can be made for reestablishing the normal duties that have been deleted.

4. EXPECTED RESULTS - The results that are expected must be recorded. This allows the plant staff to keep the special study in focus. It also creates enthusiasm for intermediate results and encourages trend monitoring that was set up in the approach. Many times when testing an hypothesis a new direction must be taken part way through the special study. By recording expected results you are able to make this determination.

5. CONCLUSIONS - Once the special study is complete conclusions are reached. The conclusions are recorded and supported with graphs and data development. The record is then placed on permanent file at the treatment plant. The conclusion reached tells a convincing story because of the documentation and scientific approach of the special study. In addition the special study and conclusion provide an excellent basis for staff training. More importantly the conclusion reached provides a basis for operational changes that will result in improved performance.

6. IMPLEMENTATION - Once a conclusion is reached an implementation phase follows. This allows you to make procedural changes that will support the conclusions of the special study.

Special studies can be an invaluable resource to both water and wastewater treatment facilities and can result in a treatment plant that is performing to its maximum capability. For best results it is important to follow the guidelines mentioned above. Remember to start out on paper and involve plant staff. If you want to implement a special study and still have trouble getting started, please call me at 444-2406 and I will help as much as I can.

(Author's Note: Although the method described is common to scientific research, many of the ideas and format for application to water and wastewater treatment facilities were provided by Bob Hegg, Process Applications, Inc., Fort Collins, Colorado.)

MONTANA SECTION
AMERICAN WATER WORKS ASSOCIATION
Membership Report

Since January 1, 1989 Montana's AWWA has grown to 196 total members, plus 11 representatives for utility memberships and 23 multi-section members. A total of 20 members have entered our ranks since January by moving to Montana, joining-up, or adding Montana as an additional AWWA section to be involved with. We've lost a few through membership drops (4), and those that have moved out of our Big Sky State (4).

Welcome New Members (January 1 to August 1):

Mike Hagel, Forsyth
John Wandke, Great Falls
Wayne Tomicich, Red Lodge
Patrick Johnson, Gt. Falls
Larry McGrail, Billings
Judy Sass, Florence
Phillip Forbes, Bozeman
and Utility Member, City of Great Falls
Gerald Smith, Galata
Gary Wilson, Helena
Allene Whitney, Helena
Bill Leonard, Whitefish
George Torp, Missoula
Mark Smith, Helena

Also Welcome New Multi-Section Members:

Richard Gustin, WA
Eric Lowe, Canada
John Ford, Ford Meter Box Co., AZ
Edward Smith, OR
Gregory Hochmuht, Yellowstone Nat'l Park
Walter Schlesier, NY

Thanks Recruiters:

Hugh Wilkins (1)
Donna Howell (1)
Lyle Meeks (1)
Ricky Russell (1)
Gerald Lukasik (1)
Dean Elliott (1)

The 1988 Top Recruiter Award was presented to Greg Acton of Whitefish. Greg signed up 6 of his operators and took home a check for $53.00 and an appreciation award. Recruiter George Wilson, Columbia Falls, was also honored with an AWWA Membership Pin for recruiting 2 or more members in 1988.

The Top Recruiter for 1989 will receive $58.00 toward AWWA dues or publications. Spread the word of AWWA's benefits, and join our competition.

Applications for AWWA membership are available in this and other issues of the Big Sky Clearwater. Sponsor signatures are not required to join AWWA.

1989 JOINT CONFERENCE
MSAWWA/MWPCA
GREAT FALLS

One hundred thirty-seven (137) conference attendees were joined by 17 spouses and 15 vendors at the Joint Conference held March 29, 30 and 31.

AWWA National President Steven Bank addressed conference attendees, as did WPCF Vice President Charles Kaiser. Both dignitaries directed their comments toward Association goals and utility problems, including increased regulatory pressure and declining revenues.

Bob Millons, 1989 Fuller Award Recipient, was honored by Montana's AWWA. Dave Schneiter, Billings WTP, received the AWWA Operator of the Year Award, and Joe Steiner received WPCA's Bedell Award.

Water Quality Bureau
Department of Health and
Environmental Sciences
Room A-206, Cogswell Building
Helena, Montana 59620

BULK RATE
U.S. POSTAGE
PAID
HELENA, MT
PERMIT NO. 89

TO:

1,750 copies of this public document were published at an estimated cost of $1.00 per copy, for a total cost of $1,750.00, which includes $1,750.00 for printing and $.00 for distribution.